

Serial No. 10/067,562

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REMARKS

Claims 1- 19 remain pending in this application with claim 1 being amended by this response.

Objection to Claims 1-19

Claims 1-19 have been objected to under 37 CFR § 1.75 (a) and (d)(1) for failing to particularly point out and distinctly claim the subject matter of the invention. Claim 1 has been amended for purposes of clarity to remove the terms mentioned by the Examiner and return claim 1 to its originally filed scope. As claim 1 is identical to the originally filed claim 1, it is respectfully submitted that no new issues are raised by this amendment. Thus it is respectfully submitted that this objection is satisfied and should be withdrawn.

Rejection of Claims 1-6 under 35 U.S.C. 102 (b)

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by "Hybrid Image Segmentation Using Watersheds and Fast Region Merging" by Haris.

The present claimed invention provides a method for fragmenting (F) images (14i) into homogeneous regions (Ri). The fragmentation (F) uses iterative merges of fragments Fi and Fj which are as similar as possible according to at least one selection parameter. The similarity is evaluated by a product $A*B$ of two factors A and B, A being consistent with a number of pixels and B being consistent with the selection parameter(s). A merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels.

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Haris neither discloses nor suggests "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A \cdot B \cdot C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels" as in the present claimed invention. Haris discloses a method for the fragmentation of images into homogenous regions. In equation 12, page 1689, of Haris, a value δ is calculated. If δ is greater than a certain threshold, then the merging process is terminated. The parameter $\mu(R_m^k)$ corresponds to the mean value of the image intensity Y over the region (R_m^k) . Consequently, μ is consistent with a selection parameter. Haris fragments using iterative merges of fragments F_i and F_j which are as similar as possible according to at least one selection parameter. This similarity is evaluated by a product of $A \times B$ of two factors A and B .

The Office Action mentions $\|R_M^i\| \times \|R_M^j\|$ as being consistent with a number of pixels and corresponding to A . Applicant respectfully disagrees. In fact, $\|R_M^i\| \times \|R_M^j\|$ in Haris is consistent with the number of pixels to the second power. Thus, the product of $A \times C$ in Haris produces a number consistent with the number of pixels. Consequently, according to equation 12, δ is consistent with a selection parameter and a number of pixels (number of pixels² divided by a number of pixels), δ depends on the size of R_M^i and R_M^j . Equation 12 corresponds to the equation on page 4, line 22 of the present specification, (C_{fu}) , where $(Y_i - Y_j)^2$ corresponds to $(\mu(R_M^i) - \mu(R_M^j))^2$, μ being a mean value of the image intensity for the corresponding regions. The problem, as explained on page 5, lines 20-25, of the present specification is that merging using parameter C_{fu} or δ favors the merging of small fragments and hence an isotropic fragmentation of the image. Haris is unable to address the issue of higher cost of merge when the number of pixels concerned in a merge increases. Haris favors the merging of small fragments.

To solve such a problem, the present claimed invention uses a criterion that is consistent with the selection parameter, for example the luminance value. Page 13, line 15, of the Specification discloses a grouping cost consistent with a number of pixels

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and a selection parameter. This grouping cost is multiplied by a parameter C consistent with the inverse of a number of pixels $C = 2/N_m$ to give the product of $A \times B \times C$, the value compared to a threshold. The product of $A \times C$ is not consistent with a number of pixels as A is consistent with a number of pixels (and not a number of pixels to the second power, as in prior art) and C is consistent with the inverse of a number of pixels. In the present invention, the fragmentation is stopped according to an expression $A \times B \times C$, which is not consistent with a pixel number. Thus, unlike the present claimed invention, Haris neither disclose nor suggest "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels."

As Claims 2-6 are dependant on Claim 1, it is respectfully submitted that these claims are allowable for the same reasons as independent claim 1. In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Haris showing the above discussed features. It is thus further respectfully submitted that claims 1-6 are not anticipated by Haris. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of Claim 7 under 35 U.S.C. 103(a)

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haris in view of Moed.

Moed, similarly to Haris, neither discloses nor suggests "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels" as in the present claimed invention. Moed describes a

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system and method for extracting image information from a video frame for regions of the video frame that likely are objects of interest in a scene. An initial region set is generated by comparing luminance image information and color image information of a background image for the scene. A high confidence region set is generated comprising regions from the initial based upon edge information of the regions and edge information in the background image. A final region set is generated by combining one or more regions in the high confidence region set if such combinations satisfy predetermined criteria, including size, region, proximity and morphological region dilation. Moed was cited to disclose an image segmentation system that operates on a color image. However, as discussed above, Moed, similarly to Haris, neither discloses nor suggests "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels," as cited in claim 1 of the present invention. As claim 7 is dependent on independent claim 1 it is respectfully submitted that claim 7 is allowable for the same reasons as claim 1.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Haris and Moed, when taken alone or in combination showing the above discussed features. It is thus further respectfully submitted that claim 7 are not anticipated by Haris or Moed when taken alone or in combination. It is thus, further respectfully submitted that this rejection is satisfied and should be withdrawn.

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Rejection of Claims 8 and 19 under 35 U.S.C. 103(a)

Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schutz in view of Haris.

Schutz, similarly to Haris, neither discloses nor suggests "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels" as in the present claimed invention. Schutz describes a method for merging regions for joint motion estimation and segmentation of digital video sequences. The region merging criterion is based on the measure of the matching error for a region when applying a previously estimated motion to it. A region adjacency graphs is used for data representation, which allows a scan independent processing and gives a high-level view. Schutz was cited to disclose a method of grouping fragments of an image characterized in that the grouping uses a model of motion individual of each fragment F_i . However, as discussed above, Schutz, similarly to Haris and Moed, neither discloses nor suggests "A being consistent with a number of pixels and B being consistent with the selection parameter(s), characterized in that a merge is performed when the product $A*B*C$ is less than a threshold consistent with the selection parameter, C being a factor consistent with the inverse of a number of pixels," as cited in claim 1 of the present invention. As claims 8 and 19 are dependent on claim 1, it is respectfully submitted that claims 8 and 19 are allowable for the same reasons as claim 1.

In view of the above remarks and amendments to the claims it is respectfully submitted that there is no 35 USC 112 compliant enabling disclosure in Haris and Schutz, when taken alone or in combination showing the above discussed features. It is thus further respectfully submitted that claims 8 and 19 are not anticipated by Haris or Schutz, when taken alone or in combination. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

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The applicant respectfully submits, in view of the above arguments, that the all arguments made by the Examiner have been addressed and this rejection should be withdrawn. Therefore, the applicant respectfully submits that the present claimed invention is patentable.

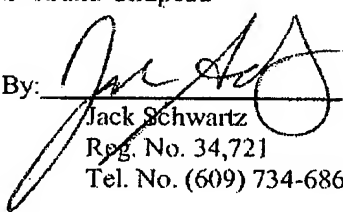
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No fee is believed due. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,
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October 25, 2005

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CERTIFICATE OF MAILING under 37 C.F.R. §1.8

I hereby certify that this amendment is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on:

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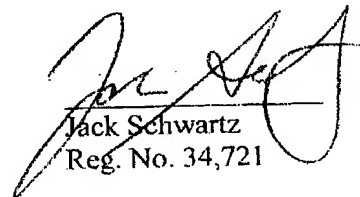
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I hereby certify that this correspondence is being transmitted by facsimile transmission to Examiner Colin M. Larose at facsimile telephone number (571) 273-8300 on Tuesday, October 25, 2005.

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